DOCUMENT RESUME

ED 182 717 CS 005 276

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TITLE Classroom Learning Environments and Achievement in a Continuous Progress Curriculum.
SPONS AGENCY Illinois Univ., Chicago. Chicago Circle Campus.
PUB DATE Apr 80
NOTE 24p.; Paper presented at the Annual Meeting of the American Educational Research Association (Boston, MA, April 7-11, 1980)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Affective Behavior; Basic Skills; *Classroom Environment; *Continuous Progress Plan; Educational Objectives; *Educational Research; Elementary Education; Management by Objectives; *Mathematics Instruction; *Program Evaluation; *Reading Achievement; Reading Programs; Reading Research; Urban Education

ABSTRACT

A cohort group of nine-year-olds in nine inner-city schools were studied over a three-year period to determine the extent of reading achievement under a continuous progress reading and mathematics curriculum instituted in a large urban school system. Changes in students' perceptions of their learning environment, such as reduced competitiveness, decreased higher thought process activities, lower perceived difficulty, and decreased satisfaction were observed. These unanticipated outcomes suggest that curriculum decision makers should examine achievement gains in a new light. Whether the anticipated achievement outcomes in a continuous progress curriculum based on specific reading and mathematics skills are attained at the expense of other important aspects of learning should be considered. (Author/MKM)

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Classroom Learning Environments and Achievement in a Continuous Progress Curriculum[1]

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Evaluators are continually admonished not to overlook unanticipated outcomes of the treatment under study (Cooley and Lohnes, 1976; Guba, 1978). Such outcomes can have either positive or negative effects that prove as pervasive as the treatment itself. Unanticipated outcomes, however, can be elusive for several reasons. First, in our zeal to measure attainment of treatment-objectives, we frequently overlook other potential outcomes. Scriven (1972) suggested goal-free evaluation as a way to guard against this type of evaluator myopia. Second, adherence to traditional input and outcome variables tends to restrict the range of variables included in research studies (Cooley and Lohnes, 1976). Third, evaluation research studies conducted in the naturalistic setting present difficulties in the exploration of unanticipated outcomes. The data cannot always be obtained as clean-cut pre/post data amenable to sophisticated statistical analysis. Bits and pieces of incomplete data (both quantitative and descriptive) need to be pulled together to identify unanticipated program effects and to interpret their positive and negative impact. The purpose of this paper is to illustrate how evaluators can use incomplete data to identify unanticipated outcomes.

Behavioral Objectives and Unanticipated Outcomes

A classic example of an unanticipated outcome is illustrated in behavioral,

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1 Paper prepared for presentation at the American Education Research Association Conference, Division B, Boston, 1980. The research was supported by the Office of Evaluation Research, College of Education, UICC. The authors wish to thank Dr. Geneva Haertel for her careful reading of the manuscript and invaluable suggestions.

objective-driven curricula which were a spin-off of the Taxonomy of Educational Objectives (Bloom et al, 1956). The original intent of the Taxonomy was to provide a conceptual framework for ordering what was historically a confusing use of concepts and constructs in the field of psychology in order to facilitate communication among educators, psychologists and measurement specialists (pp.6;10). While Tyler (1949) can be regarded as the precursor of the behavioral objectives movement, behavioral psychologists and educators did not find a common framework for developing objective-driven curricula prior to the Taxonomy. Typical of most bandwagon trends, the use of objectives in some instances became an end unto itself, and at times lost sight of the goals of education. Mager (1962) and Popham (1967) stand out as influencing education practice by specifying the exact form objectives should take, and some groups moved on to develop large banks of behaviorally stated objectives (Flanagan, Shanner, and Mager, 1971). Objectives with strong behavioral emphasis guided many of the individualized curricula and instructional schema. Identification of objectives caught on in business, medical education, the military, and a variety of training programs. As early as 1966 Ammerman and Melching (1971) identified 37 different terms, classified under three rubrics, for describing instructional objectives. Management by objectives was to become a keyword in the business world while front-end analysis dominated instructional technology during the last two decades.

Educators also used behavioral objectives in response to the accountability cry of the late 1960's and early 1970's (Pipho, 1978). This gave rise to competency-based programs, continuous progress curricula, and other skills management systems. Underlying these systems is the assumption that a program

for reading or mathematics can be developed around sequentially ordered skills. From this assumption most skills management systems have a number of common characteristics. The skills are written as behavioral objectives; criterion referenced pretests determine the entry competence of students; lessons, learning materials, and resources are either developed or identified and students enter the program at the skill level they have failed to master; frequent criterion referenced evaluation and feedback guide subsequent instructional steps; recycling options are provided if students fail to master the criterion level. As students proceed from objective to objective (skill to skill) they do so at their own pace.

Despite early pleas to consider the limitations and consequences of the heavy emphasis on educational objectives (Eisner, 1967), districts held under the accountability gun by local newspapers and the general public moved headlong into skills management systems. Prospects of negative unintended outcomes were not considered. We can surmise with confidence that Bloom et al (1956) had not anticipated the proliferation of miniscule behavioral objectives, shaped into skill management systems, used to build individualized programs and to assuage the call for educational accountability.

This paper describes the unintended effects of a system-wide program, called continuous progress curriculum (CPC), on students' perceptions of their learning environment. The primary goal of CPC focused on enhancing achievement in reading and mathematics. In conjunction with another program introduced in eight of the schools in the school system about the same time as CPC, the investigators were afforded the opportunity to observe the effects of both programs. The unanticipated outcomes of CPC were so pervasive as to negate the

other program's efforts conducted during the same time period. CPC carries objective-driven curricula and accountability to their extreme.

Design of the Study

Background of the Study

The entire school system in a large urban city was mandated by the central office to institute CPC in reading and mathematics for the purpose of enhancing achievement in these areas. Criterion referenced placement tests administered by each teacher to the class placed students in the appropriate sequence of objectives that made up the reading and mathematics program.

The students were expected to progress at their own pace, however, minimal competencies were identified and these were to be achieved at given time intervals. A rigorous system for reporting student progress was instituted. In many schools the principal kept a large wall chart monitoring the progress of the classes, and in some instances individual student progress. The charts identified the classes, the per cent of students on each objective and the changes within two-week time blocks. The burden of student achievement was on the teachers.

Schools and Subjects

Eight inner-city schools and a "model" inner city school were studied over a period of three years, from 1976-1977 to 1978-79. The eight K through 8 schools and the "model" school had several attributes in common. They were all located in depressed areas characterized by high density living and large scale

unemployment among the young males. Unlike the stereotypes of inner city schools, there was little sign of vandalism. Some of the schools were of recent vintage, but even the older school buildings, dating before the turn of the century, were well maintained. All the schools had large infusions of government funds as evidenced by additional support personnel and an abundance of instructional materials, both hardware and software. Four of the eight schools had a room with computer terminals for computer assisted instruction in mathematics and reading. All the schools had community representatives working in the building. Each of the eight schools had its own set of problems. The principals varied in style and the teaching staff differed in their levels of professional enthusiasm and esprit.

The "model" school was so designated because of its city-wide reputation as an inner city school "that works." The presence of the principal, assistant principal and community representatives were evident around the building. The students were recognized by name.

Within each school the investigation focused on a cohort group of students as they progressed through the three years. Starting with nine-year-olds in 1976-1977 as the cohort group, their progress through the grades was followed through 1978-1979 when they were eleven years old. A stable student population over this period kept the cohort group relatively intact.

Data Collection

In conjunction with another program conducted in the eight schools, the investigators and team were permitted open access to all nine schools over the three year period. In the course of the three years the investigators conducted

mini case studies of each school by observing classrooms, interviewing teachers, the administration staff and community representatives, and talking informally with custodians, parents, office staff and students in classrooms and in hallways. All the facilities in the schools were observed including learning centers, playgrounds, lunchrooms, washrooms, and special facilities. In the final year 162 classrooms were observed and approximately the same number the two preceding years.

In addition to the above activities, the investigators sought to capture a number of dimensions of the classroom learning environment as perceived by the cohort group of students. Measuring perceptions of learning environments is well grounded in social psychology theory (Walberg, 1976). A 30-item instrument used to measure student perceived learning environments consists of seven scales adapted from two instruments: My Class Inventory (Anderson, 1971) and the Cognitive Activities Rating Scale (Steele et al., 1971). The My Class Inventory consists of five scales measuring classroom social climate: Satisfaction, Friction, Competitiveness, Difficulty, and Cohesiveness; each scale consisted of four items. Two scales from the Cognitive Activities Rating Scale were added (Steele et al, 1970). These included a four-item Lower Thought Processes scale and a six-item Higher Thought Processes scale. The adapted instrument was administered in March of 1977, 1978, and 1979 to the same cohort group of students; data were collected from 9-year olds in 1977, 10-year olds in 1978 and 11-year olds in 1979.

Median grade equivalent reading achievement scores by school over a five year period were obtained from the school system's published documents for students aged 8, 11 and 13. No published mathematics standardized test scores

were available. While these age groups do not identically match the cohort group for this study, they overlap somewhat and thus give an indication of achievement trends by school. Mean raw achievement scores would have been preferable, however, only school median grade equivalents (MGE) were available in the school records.

Analysis

The mini case studies of the nine schools were compared across the three-year period within and among the schools. The profiles emerging from the case studies describe the context for understanding students perceptions of their classroom environment.

Changes in perceptions of the learning environment were examined in several ways. First, the mini case studies were reviewed to determine the extent to which CPC was implemented over the three-year period. Second, the achievement data for 11-year olds in 1976-1977, 1977-1978, and 1978-1979 (the cohort group) by school were examined. No statistical tests were possible because of the nature of the achievement data. However, the extent of increase or decrease in grade equivalents could be examined by school in the light of the learning environment data. Third, pre (1976-1977) to post (1978-1979) changes in student perceived learning environments of the cohort group were compared using t-tests by school. School was the unit of analysis on the seven learning environment scales. Lastly, pre to post differences in learning environments of the eight schools and the "model" school were studied.

Results

Extent of CPC Implementation. The mini case studies revealed the perva-

siveness of CPC, especially in years 1 and 2 (1976-1977 and 1977-1978). In all classes reading and mathematics activities dominated the educational program; little or no science and social studies activities were observed until year 3, and this only in a few classes. Music, art, and physical education activities were infrequently observed; in most cases, unless the school had a special teacher students received minimal exposure to these areas. Continuous progress charts were observed in many classrooms and in some principals' office.

Teachers reported that the pressure to show achievement in reading and mathematics through students' progress in attaining CPC's objectives eliminated time for any other curricular activities in the educational program. By year 3, the teachers carried out the bookkeeping tasks associated with CPC in a perfunctory manner and appeared somewhat more relaxed: in three of the eight schools some social studies activities were in evidence.

The model school moved from complete adherence to CPC in the first year to an enlarged curricular offering. Appendix A abstracts notations from the mini case studies to illustrate the academic emphasis.

Reading Achievement. The anticipated achievement outcome of CPC varied from age group to age group but the 11-year old group generally showed grade equivalent gains. Table 1 shows the MGE for the three age groups (8, 11, and 13) from 1977 to 1979. These age groups had been in CPC for the three-year period.

The 11-year olds in five of the eight schools showed mean MGE gains averaging 0.86 months with a range of $^{+}0.1$ to $^{+}2.7$. One school showed no gain and two schools showed decreases in achievement ($^{-}0.3$ to $^{-}0.5$). On the average, over the three-year period, in the eight schools 11-year olds gained 0.44

months from 1977 to 1979 compared to 0.1 months in the model school over the same period.

The MGE gains from 1977 to 1979 in the age 8 and 13 groups are inconsistent. Mean MGE gains for the 8-year old group is $^{+}0.25$ and for the 13-year old group (based on only four schools) $^{+}0.85$. Schools 1, 6, and 8 show steady gains in the MGE scores for each of the age groups where data are available. School 5 indicates a small decrease in MGE. The summary of gains and losses are shown in Chart 1.

Chart 1. Summary of MGE Gains and Losses

	1976-1977 to 1978-1979		
School	Age 8	Age 11	Age 13
#1	NC	+	+
#2	-	+	M
#3	NC	+	M
#4	-	-	+
#5	NC	-	-
#6	+	+	M
#7	-	NC	M
#8	+	+	+
Model School	-	+	-

NC = no change
M = missing data
+ = gain
- = loss

We can conclude that MGE gains by school are inconsistent across age groups, but across schools there are increasing MGE gains from age 8 to age 13 groups. Data are missing from half the schools for the 13 year-old group, therefore we should be cautious about making any generalization on the achievement effects

of CPC with older students.

Learning Environments Comparisons. Examining changes in student perceptions of their learning environments opened to the evaluator a host of unanticipated outcomes not built into the objectives of CPC. Table 2 shows the pre to post LEI comparisons by school. Trends across schools (see positive and negative t-values in the table) provide important data in addition to statistically significant t-values. The following observations can be made:

1. The cohort group of students perceived less Satisfaction in their learning environment after three years of instruction in CPC than before CPC was introduced in all the schools.

2. The cohort students in all nine schools perceived less Competitiveness in their learning environment; reduced perceptions of competitiveness are significant in four of the schools.

3. The cohort student group in six of the nine schools perceive less Difficulty; this is significant in four of the nine schools but not in the model school and two of the eight other schools.

4. In seven of the eight schools and the model school the cohort group perceive less Higher Thought Processes learning activities following three years of CPC. Only School 6 shows a significant increase in perceived Higher Thought Processes activities.

5. For Friction, Cohesiveness and Lower Thought Processes there are no clear cut trends.

6. Three of the nine schools indicate the most marked changes. Satisfaction and Higher Thought Processes change significantly upward and Competitiveness and Difficulty change significantly downward in School 6. School 7

and 8 take on a different profile from School 6, and more nearly reflect all the other schools except for Friction and Difficulty. The changed perceptions, however, are more striking than in the other schools. In these two schools Satisfaction, Competitiveness, and Higher Thought Processes are significantly lower following CPC; Friction is significantly higher. Chart 2 summarizes the changes.

Chart 2

Changes in Cohort Perceptions on the LEI from Pre to Post (1977-1979) and Achievement Shifts from 1977 to 1979 for 11-year olds

Schools	Sat	Fric	Comp	Diff	Cohes	HTP	LTP	11-year olds Achievement[a]
1	-	-*	-	-***	+	-	-	+
2	-***	-	-	-	+	-	-**	+
3	+	+	-	-**	+	-*	+	+
4	-	-	-***	-**	-	-***	+	-
5	-*	+	-	-	-*	-***	-*	-
6	+*	-	-*	-***	+	+**	-	+
7	-**	+***	-**	+	-***	-***	-	NC
8	-***	+**	-**	+	NC	-***	+	+
Model	-*	-	-	+	-	-***	-	+

* = Change from pre to post significant at the .05 level
** = Change from pre to post significant at the .01 level
*** = Change from pre to post significant at the .001 level
a = Changes not statistically tested
NC = No change from pre to post

Differences in learning environment scores between the eight school and the model school. Table 3 shows the pre to post mean learning environment

difference scores by school. The grand mean averages the eight schools. On each of the seven scales the sign of the difference score (post minus pre) for the model school mirrors that of the grand mean for the eight schools. The size of the model school's difference scores are most like the grand mean of the eight schools on Competitiveness, Difficulty, and Cohesiveness. It deviates most from the other eight schools on Satisfaction, Friction, and Lower Thought Processes. Summarizing the data from Table 3 we can conclude that the model school by year 3 is most like School 8 on Satisfaction, Friction, Competitiveness and Difficulty, and changes more than all the other schools on student perceptions of Lower Thought Processes.

Prior to CPC the model school was regarded as an exemplary inner-city school. Following three years of exposure to CPC changes in learning environments are not too distinguishable from the eight other inner-city schools except on the Satisfaction scale, and this is in a negative direction,

Discussions of Findings

An examination of Chart 2 permits us to make several general statements. There is a trend toward an increase in achievement over the three year period. In those schools where there is no increase in achievement, Cohesiveness in the learning environment is reduced. Whether achievement increases or not, perceived Competitiveness is reduced in the learning environment. CPC appears to be affecting the extent of perceived Higher Thought Processes in the learning activities independent of achievement gains or losses. Achievement gains do not appear to be associated with perceived Difficulty in the learning environment.

Caution must be exercised in associating the general decline in Satisfaction over the three-year period in the cohort group with CPC. Older elementary students usually perceive less Satisfaction in their learning environment than younger students (Talmage and Hart, 1977).

We find the learning environment outcomes a direct reflection of some of the salient characteristics of CPC. The curriculum in reading and the supporting criterion testing program focus on lower thought process objectives at the expense of higher thought process objectives. A partially self-paced, individualized program would be expected to reduce competition, and this we observed as an unintended outcome. If a student is placed in the program at his/her appropriate entry competency, we would expect the student to perceive the learning activity as less difficult, another unintended outcome of CPC.

While there are marked commonalities in the learning environment outcomes among the schools, there are also differences. By examining the mini case studies over the three-year period, clues to sources of these differences emerge. Some schools are moving away from a nearly total educational program devoted to development of basic skills in reading and mathematics in a continuous progress program, although in the third year CPC in the nine schools is still a major part of the curriculum regardless of grade level. Where there is evidence from the mini case studies of some programs other than CPC and/or emphasis other than cognitive skill development (Schools 1, 3, 6, 7 and the model school)*, achievement has increased for the 11-year old group over the 3-years in all of these schools but School 7 where there was no change in achievement. This finding puts achievement gains in a somewhat different light. In School 2, 4, 5,

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* See Appendix A

and 8, where there is little evidence of a move away from emphasis on CPC, achievement is down in Schools 4 and 5, but up in Schools 2 and 8. Evaluation researchers certainly need to look beyond the achievement scores to seek answers about CPC's effectiveness in enhancing reading achievement.

Among the four schools that have not moved away from CPC, there are some noticeable learning environment commonalities. Students perceptions of Satisfaction, Competitiveness and Higher Thought Processes decline over the three years. Higher Thought Processes decline is statistically significant in three of the four schools.

Some Reflections on Outcomes: Anticipated and Unanticipated

Curriculum developers and practitioners selecting curricula and planning the total educational programs should ask themselves if the unintended effects are what they want from the curriculum. Are the anticipated achievement outcomes, in the case of CPC, being attained at the expense of other important aspects of learning? Scriven (1967) raised the important issue of the need to evaluate the goals of curriculum. We need to give more than lip service to this. Through an exploration of unanticipated outcomes, this may be possible. But to do this evaluation researchers must learn to use less than perfect data that might not always be subject to the most stringent statistical tests. But all data, from all sources, intelligently considered from a number of perspectives can also yield valuable findings. These findings should be used by educational practitioners and parents to decide whether the anticipated and unanticipated outcomes are what they want as the product of their educational program. They need to ask: At what expense is achievement going up? What has happened to a "balanced" educational program? Is skill development the sole goal of education? How can we enhance reading skills without sacrificing general education goals?

References

Ammerman, H. L., and Melching, W. H. The Use of objectives in instruction. In M. D. Merrill, ed., Instructional design: Readings. New Jersey: Prentice-Hall, Inc., 1971.

Anderson, G. J., The assessment of learning environments: A manual for the Learning Environment Inventory and My Class Inventory. Halifax, Nova Scotia: Atlantic Institute for Education, 1971.

Bloom, B. S., Englehart, M. D., Furst, E. J., Hill, W. H. and Krathwohl, D. R., Taxonomy of educational objectives. Handbook I: Cognitive Domain. New York: Longmans Green, 1956.

Cooley, W. W., and Lohnes, P.R., Evaluatic research in education. New York: Irvington Publishers, Inc., 1976.

Eisner, E. W. Educational objectives: Help or hinderance? School Review, 1967, 75, 250-266.

Guba, E. G. Toward a methodology of naturalistic inquiry in educational evaluation. Los Angeles, CA: Center for the Study of Evaluation, UCLA, 1978.

Flanagan, J. C., Shanner, W. M., and Mager, R. F., Behavioral objectives: A guide to individualizing learning. Palo Alto, CA: Westinghouse Learning Press, 1971.

Mager, R. F. Preparing instructional objectives. Palo Alto, CA: Fearon Press, 1962.

Pipho, C. (Special Issue Guest Editor). Phi Delta Kappan, 1978, 59.

Popham, W. J. Appropriate educational objectives. Los Angeles, CA: Vincent Associates, 1967.

Scriven, M. The methodology of evaluation. In Tyler, R. W., Gagne, R. M., and Scriven, M. (Eds.), Prospectives of Curriculum Evaluation. Chicago: Rand McNally and Co., 1967, 39-83.

Scriven, M. Prose and Cons about goal-free evaluation. Evaluation Comment, 1972, 3(4), 1-4.

Steele, J. M., House, E. R., Lopan, S., and Kerins, T. Instructional climate in Illinois gifted classes. Center for Instructional Research and Curriculum Evaluation, University of Illinois, Urbana, 1970.

Talmage, H., and Hart, A. Investigative teaching of mathematics and its effects on the classroom learning environment. Journal of Research in Mathematics Education, 1977, 8, 345-358.

Tyler, R. W. Basic principals of curriculum and instruction. Chicago: University of Chicago Press, 1949.

Walberg, Herbert J. Psychology of learning environments: Behavioral, structural, or perceptual? In L. S. Shulman (ed.), Review of Research in Education, 1976, 4, 147-178.

Appendix A

Abstracts from the Mini-Case Studies: Academic Emphasis

Year 3

School 1

There was no evidence of any social studies or music activities [in the school]. . .One kindergarten class and one upper grade class had a science corner. One upper grade teacher spoke of having no time for activities other than reading, math, and the eighth grade Constitution test.

School 2

The academic environment is largely cognitive with emphasis on basic skills. Continuous Progress reading activities appear to occupy much of the students' time.

School 3

Continuous Progress charts are evident in classrooms, but represent only one segment of wide and diverse classroom interests.

School 4

Continuous Progress charts are evident in most classrooms. . . Students and teachers display a down-to-business attitude about their work on basic skills.

School 5

The school stresses almost exclusively cognitive activities. There are numerous indicators of the Continuous Progress emphasis. In almost every classroom observed, charts marking the students' achievement in reading are prominently displayed. Instruction in curricular areas other than reading and mathematics was infrequently observed. . .

School 6

Although the principal reports emphasis on Continuous Progress, the observation team did not observe the usual Continuous Progress charts posted in the classrooms . . . It was estimated that 60 per cent of instructional time in the classes observed [was spent on] development of skills in reading and math versus time spent on other curriculular activities . . . A science teacher comes once a week . . .

Appendix A (continued)

School 7

In most classrooms academic (with cognitive emphasis) activities prevail. Continuous Progress charts were observed in several classrooms. While the focus of the curriculum is evidently upon skill development, there is a continuous effort to integrate the affective processes with the regular cognitively based curriculum.

School 8

There appears to be little doubt that the pervasive educational emphasis is on reading and math achievement. Continuous Progress charts are posted on the walls in nearly all the classrooms observed.

Model School

Somewhat changed from last year is the de-emphasis on Continuous Progress and more emphasis on broader curricular areas. It is evident that social studies is being taught . . . also evidence of some science.

Table 1

Mdn. Grade Equivalent Achievement Reading Scores 1977 to 1979:
8, 11, and 13 Year Olds

	Age 8			Age 11			Age 13		
	1977	1979	Diff[a]	1977	1979[b]	Diff	1977	1979	Diff.
School 1	3.1	3.1	NC[c]	4.5	5.1	+0.6	5.8	6.3	+0.5
School 2	2.8	2.2	-0.6	4.1	4.2	+0.1	-	5.0	-
School 3	3.0	3.0	NC	4.1	4.3	+0.2	-	-	-
School 4	3.4	2.8	-0.6	4.7	4.2	-0.5	5.7	6.5	+0.8
School 5	2.8	2.8	NC	5.2	4.9	-0.3	7.0	6.9	-0.1
School 6	2.8	3.7	+1.1	4.6	5.3	+0.7	-	-	-
School 7	3.0	2.9	-0.1	4.6	4.6	NC	-	-	-
School 8	3.1	5.3	+2.2	4.4	7.1	+2.7	5.3	7.5	+2.2
$\bar{X}$ Diff.			+0.25			+0.44			+0.85
Model School	3.2	2.1	-1.1	4.2	4.3	+0.1	6.1	5.8	-0.3

a = Difference Mean Grade Equivalent Score from Pre to Post
b = Cohort group
c = No Change (NC)

Table 2. LEI Scales Pre/Post Mean Scores, SD, and t-values of Cohort Group

Scales	Schools																	
	1		2		3		4		5		6		7		8		Model	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
(N)	68	55	70	81	71	87	92	72	36	59	58	75	75	97	173	107	83	55
SATISFACTION																		
$\bar{X}$	7.82	7.29	10.02	8.71	7.80	8.28	8.69	8.00	9.05	7.86	8.21	9.02	10.07	9.24	10.13	9.05	8.73	7.38
SD	2.15	2.18	1.91	2.39	2.29	2.48	2.39	2.35	2.41	2.51	2.29	1.92	1.72	2.13	1.69	2.16	2.30	2.50
t	-1.35		-3.68***		1.25		-1.85		-2.28*		2.22*		-2.75**		-4.23***		-3.26*	
FRICTION																		
$\bar{X}$	10.67	9.97	10.34	10.20	10.67	10.70	10.32	10.00	10.22	10.50	10.62	10.19	9.44	10.45	8.95	9.68	10.09	2.18
SD	1.36	2.08	1.92	1.81	1.84	1.85	1.68	2.10	1.95	1.84	1.36	1.93	2.17	1.52	2.27	1.91	11.05	1.67
t	-2.25*		-0.46		0.10		-1.08		0.70		-1.50		3.59***		2.77**		2.77**	
COMPETITIVENESS																		
$\bar{X}$	9.26	8.78	8.98	8.85	8.92	8.60	9.63	8.53	8.66	8.59	9.43	8.68	9.33	8.49	8.92	8.18	9.27	8.76
SD	1.79	1.76	1.99	2.04	1.57	1.91	1.77	1.77	1.65	1.69	1.97	1.74	1.75	2.06	2.09	1.85	1.83	1.94
t	-1.49		-0.39		-1.13		-3.95***		-0.25		-2.33*		-2.83**		-3.01**		-1.56	
DIFFICULTY																		
$\bar{X}$	7.17	6.01	7.00	6.58	7.02	6.37	7.23	6.44	6.55	6.30	7.75	6.55	6.18	6.22	6.15	6.54	6.60	1.81
SD	2.05	1.47	1.69	1.68	1.68	1.63	1.87	1.97	1.62	1.77	1.83	1.64	1.92	1.50	1.65	1.68	6.38	1.66
t	-3.53***		-1.53		-2.46**		-2.62**		-0.69		-3.98***		0.15		1.91		0.29	
COHESIVENESS																		
$\bar{X}$	9.24	9.30	9.60	9.75	9.45	9.59	9.64	9.41	9.87	8.85	9.18	9.58	10.37	9.35	10.14	10.14	9.67	9.37
SD	1.96	2.35	2.12	2.13	2.10	2.03	1.96	1.89	2.03	2.10	1.47	2.02	1.82	2.07	1.74	1.75	1.72	1.96
t	0.15		0.43		0.42		-0.79		-2.33*		1.27		-3.38***		0.00		-0.95	
HIGHER TP																		
$\bar{X}$	10.57	10.25	10.81	10.50	10.62	10.19	10.94	9.60	10.71	9.44	9.62	10.49	11.31	10.54	11.12	10.16	10.60	10.44
SD	1.41	1.45	1.36	1.55	1.32	1.38	1.21	1.73	1.24	1.45	1.79	1.32	0.93	1.26	1.22	1.50	1.30	1.75
t	-1.24		-1.30		-1.99*		-5.83***		-4.37***		3.23**		-4.66***		-5.85***		-4.72***	
LOWER TP																		
$\bar{X}$	11.01	10.97	11.31	10.49	10.72	10.83	10.83	10.90	11.28	10.50	10.07	10.65	11.09	11.08	10.55	10.88	11.10	9.79
SD	1.53	1.71	1.22	1.91	1.83	1.69	1.57	1.51	1.18	1.92	2.05	2.04	1.29	1.34	1.58	1.65	1.48	1.76
t	-0.14		-3.10**		0.39		0.29		-2.20*		-1.62		-0.05		1.67		-0.62	

* = p .05
** = p..01
*** = p .001

Table 3

$\bar{X}$ Difference Scores (post-pre) on Learning Environment Scales by School

Schools	Satisfaction	Friction	Competitive-ness	Difficulty	Cohesiveness	Higher Thought Processes	Lower Thought Processes
1	-0.53	-0.70	-0.48	-1.16	+0.06	-0.32	-0.04
2	-1.31	-0.14	-0.13	-0.42	+0.15	-0.31	-0.82
3	+0.48	+0.03	-0.32	-0.65	+0.14	-0.43	+0.11
4	-0.69	-0.32	-1.10	-0.75	-0.23	-1.34	+0.07
5	-1.19	+0.28	-0.07	-0.25	-1.02	-1.27	-0.78
6	+0.81	-0.43	-0.75	-1.20	+0.40	+0.87	+0.58
7	-0.83	+1.01	-0.84	+0.04	-1.02	-0.77	-0.01
8	-1.08	+0.73	-0.74	+0.39	0.00	-0.96	+0.33
$\bar{X}$	-0.54	+0.06	-0.55	-0.50	-0.19	-0.57	-0.07
Model	-1.35	+0.96	-0.51	-0.22	-0.30	-0.16	-1.31